Claims

What is claimed is:

1. An isolated nucleic acid molecule comprising a nucleotide sequence encoding the amino acid sequence shown in Figure 1 for mature LS-DNase.

2. An expression vector comprising a nucleotide sequence encoding the amino acid sequence shown in Figure 1 for mature LS-DNase operably linked to a promoter recognized by a host cell transformed with the vector.

3. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes an amino acid sequence having at least 95% identity with the amino acid sequence shown in Figure 1 for mature LS-DNase.

4. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes an amino acid sequence that differs from the amino acid sequence shown in Figure 1 for mature LS-DNase by the substitution of one amino acid for another at only a single position within the Figure 1 sequence.

5. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes an amino acid sequence that differs from the amino acid sequence shown in Figure 1 for mature LS-DNase by the substitution of one amino acid for another at only two positions within the Figure 1 sequence.

6. A host cell transformed with an expression vector comprising a nucleotide sequence encoding the amino acid sequence shown in Figure 1 for mature LS-DNase.

7. A method of using a host cell transformed with an expression vector comprising a nucleotide sequence encoding the amino acid sequence shown in Figure 1 for mature LS-DNase, which comprises culturing the host cell under conditions such that expression vector is replicated.

8. A process which comprises transforming a host cell with a nucleic acid molecule that encodes a polypeptide comprising the amino acid sequence shown in Figure 1 for mature LS-DNase and culturing the host cell under conditions such that the polypeptide is produced in the host cell.

9. A method for producing LS-DNase comprising:

   (a) transforming a cell containing an endogenous LS-DNase gene with a homologous DNA comprising an amplifiable gene and a flanking sequence of at least about 150 base pairs that is homologous with a DNA sequence within or in proximity to the endogenous AL-1 gene, whereby the homologous DNA integrates into the cell genome by recombination;

   (b) culturing the cells under conditions that select for amplification of the amplifiable gene, whereby the LS-DNase gene is also amplified; and thereafter

   (c) recovering LS-DNase from the cells.

10. An isolated polypeptide comprising the amino acid sequence shown in Figure 1 for mature LS-DNase.

11. An isolated polypeptide comprising an amino acid sequence having at least 95% identity with the amino acid sequence shown in Figure 1 for mature LS-DNase, which polypeptide has DNA-hydrolytic activity.

12. An isolated polypeptide comprising an amino acid sequence that differs from the amino acid sequence shown in Figure 1 for mature LS-DNase by the substitution of one amino acid for another at only a single position within the Figure 1 sequence.

13. A polypeptide of claim 12 wherein the amino acid substitution creates a glycosylation site within the polypeptide that is not present in human LS-DNase.

14. A pharmaceutical composition comprising a polypeptide comprising the amino acid sequence shown in Figure 1 for mature LS-DNase and a physiologically acceptable excipient.

15. A composition of claim 14 that is sterile.

16. An antibody that is capable of binding to the amino acid sequence shown in Figure 1 for mature LS-DNase.

17. An antibody of claim 16 that is a monoclonal antibody.

18. A method for the treatment of a patient having a pulmonary disease or disorder comprising administering to the patient a therapeutically effective amount of LS-DNase.

19. The method of claim 18 wherein the disease or disorder is cystic fibrosis.

20. A method for the treatment of a patient having systemic lupus erythematosus comprising administering to the patient a therapeutically effective amount of LS-DNase.